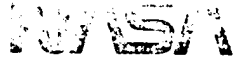


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National Aeronautics and
Space Administration

Washington, D.C.
20546

Office of the Administrator

August 26, 1983

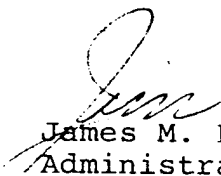
Honorable William Clark
Assistant to the President for
National Security Affairs
The White House
Washington, D.C. 20506

Dear Bill:

I just received the enclosed letter from John Yardley of McDonnell Douglas. This is our first formal industrial commitment to use Space Station commercially. I am confident there will be many more commitments of this kind as we move into planning and implementing a Space Station.

With best personal regards.

Sincerely,



James M. Beggs
Administrator

cc:

Commerce - Mr. Baldrige

STAT



25th Anniversary
1958-1983

JOHN F. YARLEY
PRESIDENT

(314) 232-9906

23 August 1983
E002-JFY-431

Mr. James M. Beggs
Administrator
NASA
4th and Maryland Avenues, S.W.
Washington, D.C. 20546

Dear Jim:

After participating in the recent White House meeting on commercial space activity, I thought it appropriate to review the McDonnell Douglas Electrophoresis Operations in Space (EOS) Program relative to the potential development of a man-habited space station by NASA.

As you know, McDonnell Douglas and Johnson & Johnson are actively pursuing the development of an electrophoresis process that will use the gravity-free environment of space to produce pharmaceutical products that cannot be economically produced on Earth. We are now developing our first protein product, a natural hormone currently unavailable. Since 1976, we have spent many millions of dollars on this effort. We have been successful in proving the validity of our concept in our first three Shuttle flights with our continuous flow electrophoresis research equipment. We are now designing a production version of our system which will fly in the payload bay of the Shuttle in 1985 and 1986 and therefore, our expenditure rate has greatly accelerated.

We believe that the potential for manufacturing new and improved pharmaceuticals in space is real and attainable. While shuttle-based research has been successful, this method is slow and laborious. With the opportunity for research and development of new products that a space station would provide, we could during the 1990s bring five times the number of new breakthrough pharmaceuticals to market. Also, the costs of development and production of these new products can be greatly reduced.

Our recent work with live cell material such as the islets (beta cells) being studied in cooperation with Washington University School of Medicine as a potential cure for diabetes, leads us to believe that it will be impossible to automate a facility that could successfully separate live cells by electrophoresis. Unlike protein materials, the sensitivity of

MCDONNELL DOUGLAS

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23 August 1983
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living organisms, i.e., beta cells, to operating conditions within the system dictates a man interface during processing to ensure their survival. If the current treatment under investigation proves successful, it follows that without a space station the probability of achieving a population-wide cure for diabetes is low.

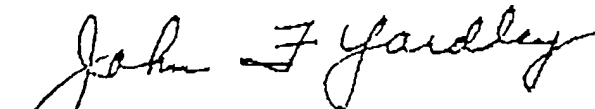
As you know, we are striving to begin commercial production of our first protein product in early 1987 or before. Because a space station would not be available until the early 1990s, we are planning to use dedicated unmanned free flying spacecraft for increased production. Serious negotiations are presently under way with three companies willing to invest private funds to build this spacecraft. We look at this initial commercial step as being only interim.

We have been encouraged by the progress NASA has been making in defining such a space station program. Consider this a formal request for the McDonnell Douglas EOS Program to be included as the first commercial user of a NASA space station.

Assuming our continued success in this activity, you may consider this a formal commitment to use the space station as the major base of operations for carrying out and expanding this new industry.

Sincerely yours,

MCDONNELL DOUGLAS CORPORATION



John F. Yardley
President
MCDONNELL DOUGLAS ASTRONAUTICS COMPANY

JFY:skw



National Aeronautics and
Space Administration

Washington, D.C.
20546

Office of the Administrator

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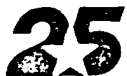
The Honorable James A. Baker, III
Chief of Staff and Assistant
to the President
The White House
Washington, D.C. 20500

Dear Jim:

I have just spoken with Al Shepard. He told me about your interest in the Space Station and relayed your request for some background information. I have enclosed a number of papers which will familiarize you with our argumentation, which present Mac Baldrige's strong views on the program, and which provide some information on the history and current state-of play of this endeavor. Also, following up on your conversation with Al, I am enclosing a statement that might be used by the President in announcing a decision to go ahead with the Space Station.

As you know, the President is being given the choice to commit this nation to the development of a permanently manned Space Station, or to defer that commitment until we study it some more. I am convinced that we are ready to proceed: the Space Shuttle -- the key to our routine access to space -- is available; the technologies needed for the Space Station are understood and their development is within reach; and commercial and scientific requirements for the Space Station exist now.

NASA has been studying the Space Station for years. If the President decides to commit to the program, hardware construction could begin in 1987 and the station could be operational by 1991. We estimate that the cost of the program would be approximately \$8 billion spread over the next eight years, with FY 1985 costs of approximately \$225 million. The first step in the program would be an intensive planning and definition period; the bulk of the spending would not begin until the hardware development phase in 1987. The early planning years would give us the opportunity to get a good handle on the system design and costs before major costs are



25th Anniversary
1958-1983

incurred. Because of our extensive efforts to date, however, I am convinced that this program is as well estimated as any other similar program at this stage of development.

After several years of uncertainty in the last Administration, this Administration's National Space Policy goal of expanding US private sector investment and involvement in space has generated a substantial momentum. During an August 3 presentation to the President, industry representatives were emphatic about their support for a Space Station because of its commercialization potential. The private sector told the President that it now needs stability in the civil space program and national commitment to a Space Station if real capital is to be put at risk. Moreover, this is just the beginning. A Space Station will provide us the opportunity to learn through experience and to uncover new ways to use space.

Mac Baldrige and I are convinced that commercial and scientific needs -- and, just as importantly, commercial and scientific potential -- warrant this undertaking. Because the program is justified on the basis of civil needs, NASA would undertake it as part of the nation's civil space program. Despite the current absence of formal national security requirements, I believe that a civil Space Station would serve as a valuable national resource. It could enable the National Security Community to do research and to explore the potential military uses of a permanently manned space facility.

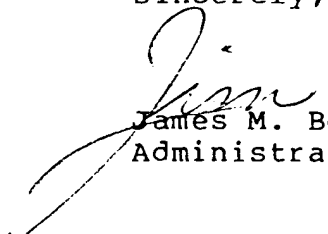
It is very important to recognize that the Soviets have already committed to a permanent manned presence in space; the Intelligence Community estimates that they will achieve this goal by 1986. The Intelligence Community also believes that the Soviets will conduct this program so as to receive frequent worldwide attention and to enhance Soviet prestige. Immediate initiation of a U.S. Space Station would serve to counterbalance this highly visible Soviet challenge to our space leadership. It would also put us in a position to learn as much about man's permanent role in space as they are learning.

Foreign participation in this highly visible, prestigious program would also give our friends and allies the opportunity to continue to share in the benefits of our civil space program. I am confident that, based on NASA's 25-year experience with international collaboration in high technology programs, cooperation can be structured so as to minimize any risk of unwarranted technology transfer.

The choice for the President is either to commit or to defer. It is becoming increasingly clear that the Space Station will be this nation's next major space venture. If we move now, Americans will be permanently in space just as the Space Shuttle celebrates its 10th anniversary. NASA is ready. Further study is not required. This nation has been in space for 25 years and it is this President's opportunity to take the next bold step forward.

With highest regards,

Sincerely,



James M. Beggs
Administrator

Enclosures

- 1) Argumentation for Space Station
- 2) Argumentation against deferral
- 3) Beggs to Clark letter
- 4) Baldrige to Clark letter
- 5) History and current state-of-play
- 6) Presidential announcement

ARGUMENTATION FOR SPACE STATION OPTION
(from SIG(Space) Issue Paper)

- o United States space leadership is being actively challenged by the Soviets. NASA believes that what the Soviets have learned during their Salyut program has led them to commit to developing a permanently manned, primarily military Space Station. A visible, highly publicized, continuously manned Soviet Space Station will receive frequent worldwide attention and enhance Soviet prestige. Thus, some believe that a U.S. Space Station would define a "race" which the U.S. would be widely perceived as having lost. However, proponents of this option are confident that the U.S. Space Station will be more capable and even more highly visible. An immediate commitment to a U.S. Space Station is essential to counter the Soviet challenge to our space leadership and to put us in a position to learn as much about man's permanent role in space as the Soviets have learned. Furthermore, a Space Station will enable us to compete in "races" yet to be defined, such as a manned lunar base or a manned Mars mission which the Intelligence Community believes could be undertaken by the Soviets within the next 15 years.
- o A Space Station is the fulfillment of the President's July 4, 1982, statement that "we must look aggressively to the future by demonstrating the potential of the Shuttle and establishing a more permanent presence in space." A Space Station is necessary to maintain real and perceived U.S. leadership in space and also to best satisfy many of the goals and objectives of the National Space Policy. In particular, a Space Station will enable us to conduct civil and commercial activities in space that will satisfy the National Space Policy goal of obtaining economic and scientific benefits through the exploitation and exploration of space.
- o A permanently manned Space Station is the preferred vehicle for conducting the vast majority of existing and projected civil and commercial space missions. A Space Station presents the most efficient and effective alternative for satisfying the full range of these needs. Furthermore, the number of civil and commercial needs that are better served by other alternatives is limited.
- o A U.S. decision to develop a permanently manned Space Station would be a reaffirmation to the world of American's commitment to technological superiority and to space leadership.
- o Foreign participation in this highly visible program would give our allies the opportunity to continue to share in the benefits of our civil space program. Foreign participation in the Space Station would also reap the benefit to the U.S. of limiting foreign resources available for cooperation with the Soviets or for undertaking large, potentially competing programs of their own. At the same time, international involvement in a Space Station could be used to counter Soviet propaganda attempts related to the U.S. space program.

- o NASA's civil space program is consistent with the priorities established in the President's policy guidance and honors the Administration's prior commitments embodied in on-going NASA programs. Because the Space Transportation System is the primary launch system for both national security and civil government missions, and because the first priority of the STS program is to make the Space Shuttle fully operational and cost-effective, high NASA priority is placed in this area. NASA is convinced that the development of a permanently manned Space Station is necessary to maintain real and perceived U.S. leadership in space and also to best satisfy many of the other goals and objectives of the National Space Policy. In particular, a Space Station would enable the U.S. to conduct civil and commercial activities in space to satisfy the National Space Policy goal of obtaining economic and scientific benefits through the exploitation and exploration of space. Because of this conviction, NASA believes that the U.S. should undertake a Space Station at any NASA budget level. However, to conduct the Space Station program effectively and to utilize it to its fullest, the level and pace of total NASA funding should be sufficient to maintain focused and vigorous efforts in all areas of the civil space program. Furthermore, a civil Space Station program should not adversely affect current and projected space programs and overall priorities in the military and intelligence sectors.

NASA and private industry have looked at civil and commercial needs for space missions. This NASA assessment indicates that a permanently manned civil Space Station is the preferred means for conducting the majority of those missions. The Space Station would provide the following capabilities:

- o A permanently manned Space Station is absolutely necessary if we are to understand man's role in space. What we have learned so far makes it clear that the physical and psychological aspects of long-duration visits cannot be extrapolated from short-visit data. Furthermore, we only learn by doing--the facilities and equipment to allow us to work in space are part of the Space Station.
- o The Space Station could enable extensive commercial exploitation of space by providing capabilities that are not currently available to the private sector. These capabilities arise because the Space Station would uniquely couple manned presence with unlimited stay-time in orbit.
- o The Space Station would be a permanent base for the efficient tending, servicing and repair of unmanned platforms and satellites, thereby increasing the lifetime of expensive space assets and offering the flexibility to upgrade space systems as technology improves. This efficiency derives from the fact that the servicing equipment is stored on the station and does not have to be brought up on the Shuttle for each individual servicing mission.
- o The Space Station would also enable the on-orbit assembly and check-out of large space structures such as antennas, astronomical telescopes, and satellites prior to their deployment.

ARGUMENTATION AGAINST DEFERRAL OPTION
(from SIG(Space) Issue Paper)

- o NASA is ready to begin the development of a Space Station. The Shuttle, always envisioned as a precursor to a Space Station, is now available. The technology requirements are understood and research is under way. Most importantly, the Space Station is needed to satisfy the full range of existing and projected civil and commercial space needs for the rest of the century.
- o NASA believes that the undertaking of a civil Space Station is not premature, but rather will provide an important resource for the national security community. The civil Space Station would provide a facility in being for future national security activities at such time that the national security community develops requirements for a manned presence with unlimited stay-time in orbit. That the Soviets have defined their own national security requirements and are meeting them now with an operational system suggests that future U.S. national security requirements will emerge and will need to be satisfied. In the meantime, Americans will be learning how to live and work in space.
- o After several years of uncertainty in the previous Administration, the nation's civil space program has now built up substantial momentum. A Space Station will maintain this all-important momentum. A decision now to defer the station's development will damage this momentum. It will act as a brake upon the entire civil program and upon U.S. space commercialization efforts. It will send the wrong signals abroad with respect to U.S. commitments to space leadership and technological superiority.
- o Self-generated international interest in a U.S. Space Station has led Europe, Japan and Canada to earmark close to \$5 million of their own funds for independent planning studies. They are now approaching major decision points on their own space activities for the next decade. In each case, collaboration on Space Station is juxtaposed against the undertaking of large, competitive national programs. Delay in our proceeding with a Space Station could have the effect of precluding significant international investment in our program, and diverting foreign space expenditures into competing efforts.
- o In announcing our National Space Policy on July 4, 1982, President Reagan asserted that "we must look aggressively to the future by demonstrating the potential of the Shuttle and establishing a more permanent presence in space." On April 11, 1983, he personally directed a study to serve as the basis for a decision on whether or not to proceed with the NASA development of a permanent manned Space Station. NASA is ready to respond to the President. Further study of this issue is not required. The nation has been in space for 25 years and it is this President's opportunity to take the next major step forward.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Office of the Administrator

Honorable William Clark
Assistant to the President for
National Security Affairs
The White House
Washington, D.C. 20506

August 18, 1983

Dear Bill:

In response to the NSC request for written agency positions on the Space Station issue, I would like to reiterate the points that I made at the August 10 SIG(Space) meeting on that subject.

NASA believes that the Administration should commit now to the development of a permanently manned civil Space Station. Commercial and scientific needs -- and, perhaps more importantly, commercial and scientific potential -- warrant this undertaking. A permanently manned Space Station is the preferred vehicle for conducting the vast majority of existing and projected civil space missions for the rest of the century. Because a Space Station is justified on the basis of civil needs, NASA believes that the program should be funded out of the nation's civil space budget.

After several years of uncertainty in the last Administration, this Administration's National Space Policy goal of expanding US private sector investment and involvement in space has generated a substantial momentum. During an August 3 presentation to the President, industry representatives were emphatic about their support for a Space Station because of its commercialization potential. The private sector told the President that it now needs stability in the civil space program and a national commitment to a Space Station if real capital is to be put at risk. Moreover, this is just the beginning. A Space Station will provide us the opportunity to learn through experience and to uncover new ways to exploit and explore space.

Despite the current absence of national security requirements for a Space Station, NASA is confident that a civil Space Station will serve as a valuable national resource. The Space Station will enable the national security

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community to do research, to learn about military man's role in space, and to explore the potential military uses of a permanently manned space facility. In the future, the modular design of the Space Station will permit the accommodation of military requirements, when and if they arise.

US space leadership is being actively challenged by the Soviets. What the Soviets have already learned during their Salyut program has led them to commit to developing a permanently manned space station. A visible, highly publicized, continuously manned Soviet space station will receive frequent worldwide attention and will enhance Soviet prestige. Abdicating to the Soviets in this area, without providing a counterbalancing U.S. presence, is politically unacceptable. An immediate commitment to a US Space Station is essential to counter the Soviet challenge to our space leadership and also to put us in a position to learn as much about man's permanent role in space as they are learning.

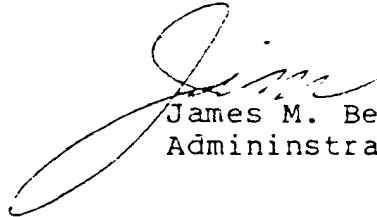
Foreign participation in this highly visible program will give our allies the opportunity to continue to share in the benefits of our civil space program. Self-generated international interest in a US Space Station has led Europe, Canada and Japan to earmark close to \$5 million of their own funds for independent planning studies. These countries will be spending significant resources on space in the future. In fact, they are now approaching major decision points in their own space programs for the next decade. In each case, collaboration on Space Station is juxtaposed against the undertaking of large, competitive national programs. Delay in our proceeding with a Space Station could have the effect of precluding significant international investment in our programs, and of diverting foreign resources into competing efforts. Following NASA's long and successful experience with international collaboration in high technology programs, international collaboration on the Space Station can be conducted so as to minimize risks of unwarranted technology transfer.

NASA is convinced that a Space Station is necessary to maintain real and perceived US leadership in space and also to satisfy many of the other goals and objectives of the National Space Policy. Thus NASA believes that the US should undertake a Space Station program at any NASA budget level. However, to conduct the Space Station program effectively and to utilize it to its fullest, the level and pace of total NASA funding should be sufficient to maintain focused and vigorous efforts in all areas of the civil space program. Furthermore, a civil Space Station program should not adversely affect current and projected space programs and overall priorities in the national security area.

NASA shares the interest of the national security community in maintaining a strong Shuttle program. The Shuttle is the key to routine access to space for both civil and national security missions. Making the Shuttle fully operational and cost-effective will remain NASA's highest priority. NASA is committed to achieving the full capabilities required of the nation's Space Transportation System.

In conclusion, I would like to add a personal note. When the President joined me in California on July 4, 1982, for the landing of the Columbia, he said that "we must look aggressively to the future by demonstrating the potential of the Shuttle and establishing a more permanent presence in space." NASA is ready to respond. Further study of this issue is not required. The nation has been in space for 25 years and it is this President's opportunity to take the next major step forward.

Sincerely,



James M. Beggs
Admininstrator



AUG 23 1983

Honorable William P. Clark
Assistant to the President for
National Security Affairs
The White House
Washington, D.C. 20500

Dear Bill,

This is the appropriate time for the United States to take its next major step in advancing the technology and utilization of space systems. There has been no major official guidance in this area since that of President Nixon.

No initiative will reflect more favorably upon the United States and this Administration than the development of a permanent manned station in space.

The first 25 years of the space program have provided us with superb governmental and commercial capabilities in space. We now have the Space Shuttle to provide routine transportation of crews and machines to and from space. That capability should now be harnessed to the greater governmental and commercial opportunities that a space station will make possible.

My chief concern is that the options discussed at the SIG (Space) meeting are too timid. If we are to obtain the industrial stimulation and receive the benefits I believe to be possible, we must move aggressively. None of the options presented is sufficient by itself. For this reason, I advocate a four-part program in space.

NASA wishes to begin the development of a space station that will be placed in an orbit at a relatively small angle with respect to the equator. They should do so as soon as possible. The Soviets are already there and are learning the things that we should be learning. Each delay we create -- for the very rational reason of spending more effort on studying what we should do -- puts us farther behind. The station should have a full capability to serve scientific and commercial needs as early in its evolution as is feasible. This implies that it be accompanied by such support facilities as necessary to produce early payoffs -- e.g., co-orbiting man-tended platforms for commercial materials processing activities and man-tended platforms in polar orbit for remote sensing applications.

Defense is concerned that a manned space station program will dilute NASA's emphasis on bringing the Space Shuttle to a fully operational state and improving its capabilities. This is a reasonable concern. The Nation requires a fully operational Space Shuttle, and it needs a Shuttle that can remain in orbit for longer periods than the current system. This is not a separate option from pursuing the development of a space station; it is a necessary capability for all future scenarios for the expanded use of space systems. It must be carried out in parallel with the space station and will involve the production of a fifth orbiter specially outfitted for enhanced orbital capability. Commercial and governmental users will require extended periods in orbit beyond the current five to seven days. Indeed, it is not inconceivable that the assembly of a space station may be more efficiently carried out with the extended orbit time.

The last two parts of the program I advocate are not directly aimed at the space station, but at programs with which the space station must coexist.

The science and applications community bears many scars from the Apollo and Space Shuttle programs. The perception, no matter what the reality may be, is that the user community's interests were always subordinated to the more glamorous manned activities. To prevent a large and counterproductive outcry from that community, the space station program must have a parallel effort, separately budgeted, to support the uses of the station and its companion man-tended platforms.

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The above four-part program will ensure U.S. leadership in space, revitalize our civilian space program, and create the capabilities needed for the expansion of U.S. industrial activities in space. I believe that what the President has to consider very carefully are the consequences -- both military and industrial -- of our being second in this effort.

Sincerely,



Malcolm Baldrige

BACKGROUND/HISTORICAL EVOLUTION

- o Space Station concepts have been under study since the mid-60's
 - starting with Saturn/Apollo derivation (Manned Orbital Research Laboratory)
 - evolved to Skylab development in late '60's/early '70's
- c Skylab was first U.S. Space Station
 - launched in May, 1973
 - useful life of 1-1/2 years
 - three crews (three men each) habited for 28, 58 and 84 days
 - demonstrated that humans could live and work effectively in space
 - entire \$2.5 billion mission was salvaged through early EVA repair
 - valuable real-time solar science performed
- o advanced concept studies continued through 1970's
 - Spacelab
 - Manned Orbital Systems Concept
 - Geosynchronous Space Station
 - Space Construction Base
 - Power Systems (PEP, 25 kw)
 - Platforms
 - Space Operations Center
- q Original STS concepts included both Shuttle and Space Station
 - decision made to develop delivery system first
 - Spacelab designed as near-term laboratory but, limited to Shuttle availability/stay time
 - with Shuttle operational makes sense to plan for Space Station now

SPACE STATION TASK FORCE ORGANIZATION/APPROACH

- o Established in May, 1982 by the NASA Administrator
- o NASA-wide activity: Centers and Headquarters
 - includes detailees from 8 field centers plus Headquarters program and staff offices
- o Provide focus and direction for the agency's Space Station planning activities
- o Define possible Space Station initiative
 - mission requirements
 - architectural options
 - trade studies
 - advanced development
 - systems engineering/concept development
- o Develop management/acquisition plans

SPACE STATION MISSION REQUIREMENTS STUDIES

- o 8 month contracted studies by Boeing, General Dynamics, Grumman, Lockheed, Martin-Marietta, McDonnell Douglas, Rockwell and TRW
- o Final briefings - April 5-8, 1983, Washington, DC
- o General conclusions:
 - Unanimous agreement on need for permanent manned Space Station
 - All mission areas appear to derive significant, often enabling benefits from existence of a Space Station
 - science & applications
 - technology development
 - commercial
 - national security
 - Initial station in low inclination orbit with unmanned platform in polar orbit
 - Significant savings derived from space-based OTV
 - There are no technology "show stoppers"
 - Need for increased power will be a challenge
- o Concurrent mission requirements studies by international community (ESA, Japan, Canada, German, Italy) to be completed April/May 1983
- o Total cost of Mission Requirements Study
 - NASA \$6.0
 - DOD .3
 - \$6.3 million

PRESIDENTIAL ANNOUNCEMENT

We are in the midst of history, surrounded by reminders of America's leadership in space. America's first satellite, Explorer I, was launched from the Cape in 1958. Since that momentous day, the United States' space program has been characterized by the acceptance of seemingly impossible challenges. And, nowhere have these challenges been as critical as in our manned space programs. Mercury, Gemini, Apollo, Skylab, and Shuttle. The whole world has watched Americans meet and beat the challenges.

As a nation, we are committed to leadership in space and to technological superiority. We now stand at the edge of a new, great opportunity. The Space Shuttle -- the key to our routine access to space -- has just completed its eighth flight. America has been in space for 25 years and we are second to none. I have decided that it is time for us to take the next bold step forward. I have therefore directed NASA to begin immediately the development of a permanently based manned Space Station. By 1991, Americans will be living and working in space permanently.

The Space Station is a place where we can do important work in space. It will facilitate extensive commercial use of space by providing capabilities that are not now available. It will enable the commercial production of critical materials that cannot be obtained on earth, such as extremely pure pharmaceuticals. It will serve as a permanent base for efficient satellite tending and servicing, thereby increasing the lifetime of our expensive space assets. It will also allow us to upgrade our space systems as technology improves. From its Space Station, the United States will assemble and launch extremely large space structures such as antennas, telescopes and satellites. In the scientific area, the Space Station will provide a unique national capability to conduct space-based research in

areas such as astrophysics, solar system exploration, earth science, life sciences, materials processing and communications. Space Station research focused on extending man's stay-time in space could permit future manned exploration and exploitation of space. Thus, in the longer term, a Space Station will provide the necessary first step for future historical advances in space.

Our civil space program has been conducted since its beginning in close cooperation with other countries. Foreign participation in this highly visible program will allow us to continue working with our friends and allies. It is important for us to recognize that in relationships that are marked by competition in high technology, there is ample room for cooperation and shared benefits.

The undertaking of this major project will contribute to a revitalization of the aerospace industry and broad segments of the non-aerospace industry. It will also stimulate the development of new technology just as other previous technological programs of this magnitude have done. And this is just the beginning. A Space Station will provide us the opportunity to learn through experience and to uncover new ways of using space for peaceful purposes for the benefit of all mankind.